

WHAT IS CLAIMED IS

1 1. A pharmaceutical composition comprising a MTB39 antigen or an
2 immunogenic fragment thereof from a *Mycobacterium* species of the tuberculosis
3 complex, and a MTB32A antigen or an immunogenic fragment thereof from a
4 *Mycobacterium* species of the tuberculosis complex.

1 2. The composition of claim 1, comprising a MTB39 antigen or an
2 immunogenic fragment thereof from a *Mycobacterium* species of the tuberculosis
3 complex, and a polypeptide comprising at least 205 amino acids of the N-terminus of a
4 MTB32A antigen from a *Mycobacterium* species of the tuberculosis complex.

1 3. The composition of claim 2, further comprising a polypeptide
2 comprising at least about 132 amino acids from the C-terminus of MTB32A antigen from
3 a *Mycobacterium* species of the tuberculosis complex.

1 4. The composition of claims 1, 2, or 3, wherein the antigens are
2 covalently linked, thereby forming a fusion polypeptide.

1 5. The composition of claim 4, wherein the fusion polypeptide has the
2 amino acid sequence of MTB59F.

1 6. The composition of claim 4, wherein the fusion polypeptide has the
2 amino acid sequence of MTB72F.

1 7. The composition of claim 4, wherein the antigens are covalently
2 linked via a chemical linker.

1 8. The composition of claim 7, wherein the chemical linker is an
2 amino acid linker.

1 9. The composition of claim 1, further comprising at least one
2 additional antigen from a *Mycobacterium* species of the tuberculosis complex, wherein
3 the antigen is selected from the group consisting of MTB8.4 antigen, MTB9.8 antigen,
4 MTB9.9 antigen, MTB40 antigen, MTB41 antigen, ESAT-6 antigen, MTB85 complex
5 antigen, or α -crystalline antigen, or an immunogenic fragment thereof.

1 10. The composition of claim 1, further comprising an adjuvant.

1 11. The composition of claim 10, wherein the adjuvant comprises
2 QS21 and MPL.

1 12. The composition of claim 10, wherein the adjuvant is selected from
2 the group consisting of AS2, ENHANZYN, MPL, QS21, CWS, TDM, AGP, CPG, Leif,
3 saponin, and saponin mimetics.

1 13. The composition of claim 1, further comprising BCG.

1 14. The composition of claim 1, further comprising an NS1 antigen or
2 an immunogenic fragment thereof from a *Mycobacterium* species of the tuberculosis
3 complex.

1 15. The composition of claim 1, wherein the *Mycobacterium* species is
2 *Mycobacterium tuberculosis*.

1 16. An expression cassette comprising a nucleic acid encoding a
2 MTB39 antigen or an immunogenic fragment thereof from a *Mycobacterium* species of
3 the tuberculosis complex, and a nucleic acid encoding a MTB32A antigen or an
4 immunogenic fragment thereof from a *Mycobacterium* species of the tuberculosis
5 complex.

1 17. The expression cassette of claim 16, comprising a nucleic acid
2 encoding a MTB39 antigen or an immunogenic fragment thereof from a *Mycobacterium*
3 species of the tuberculosis complex, and a nucleic acid encoding a polypeptide
4 comprising at least 205 amino acids of the N-terminus of a MTB32A antigen from a
5 *Mycobacterium* species of the tuberculosis complex.

1 18. The expression cassette of claim 17, further comprising a nucleic
2 acid encoding a polypeptide comprising at least 132 amino acids of the C-terminus of a
3 MTB32A antigen from a *Mycobacterium* species of the tuberculosis complex.

1 19. The expression cassette of claim 16, wherein the nucleic acid
2 encodes a fusion polypeptide comprising a MTB39 antigen or an immunogenic fragment
3 thereof and a nucleic acid encoding a MTB32A antigen or an immunogenic fragment
4 thereof.

1 20. The expression cassette of claim 19, wherein the nucleic acid
2 encodes a fusion polypeptide comprising a MTB39 antigen or an immunogenic fragment
3 thereof, and a polypeptide comprising at least 205 amino acids of the N-terminus of a
4 MTB32A antigen.

1 21. The expression cassette of claim 20, wherein the fusion
2 polypeptide further comprises a polypeptide comprising at least 132 amino acids of the C-
3 terminus of a MTB32A antigen.

1 22. The expression cassette of claim 20, wherein the nucleic acid
2 encodes a fusion polypeptide having the amino acid sequence of MTB59F.

1 23. The expression cassette of claim 22, wherein the nucleic acid has
2 the sequence of the nucleic acid encoding MTB59F.

1 24. The expression cassette of claim 21, wherein the nucleic acid
2 encodes a fusion polypeptide having the amino acid sequence of MTB72F.

1 25. The expression cassette of claim 24, wherein the nucleic acid has
2 the sequence of the nucleic acid encoding MTB72F.

1 26. The expression cassette of claim 16, further comprising a nucleic
2 acid encoding at least one additional antigen from a *Mycobacterium* species of the
3 tuberculosis complex, wherein the antigen is selected from the group consisting of
4 MTB8.4 antigen, MTB9.8 antigen, MTB9.9 antigen, MTB40 antigen, MTB41 antigen,
5 ESAT-6 antigen, MTB85 complex antigen, or α -crystalline antigen, or an immunogenic
6 fragment thereof.

1 27. The expression cassette of claim 16, further comprising a nucleic
2 acid encoding an NS1 antigen or an antigenic fragment thereof from a *Mycobacterium*
3 species of the tuberculosis complex.

1 28. The expression cassette of claim 16, wherein the *Mycobacterium*
2 species is *Mycobacterium tuberculosis*.

1 29. A method for eliciting an immune response in a mammal, the
2 method comprising the step of administering to the mammal an immunologically

1 40. The method of claim 39, wherein the adjuvant comprises QS21 and
2 MPL.

1 41. The method of claim 39, wherein the adjuvant is selected from the
2 group consisting of AS2, ENHANZYN, MPL, QS21, CWS, TDM, AGP, CPG, Leif,
3 saponin, and saponin mimetics.

1 42. A method for eliciting an immune response in a mammal, the
2 method comprising the step of administering to the mammal an immunologically
3 effective amount of an expression cassette comprising a nucleic acid encoding a MTB39
4 antigen or an immunogenic fragment thereof from a *Mycobacterium* species of the
5 tuberculosis complex, and a nucleic acid encoding a MTB32A antigen or an
6 immunogenic fragment thereof from a *Mycobacterium* species of the tuberculosis
7 complex.

1 43. The method of claim 42, wherein the mammal has been immunized
2 with BCG.

1 44. The method of claim 42, wherein the mammal is a human.

1 45. The method of claim 42, wherein the composition is administered
2 prophylactically.

1 46. The method of claim 42, wherein the nucleic acid encodes a fusion
2 polypeptide comprising a MTB39 antigen or an immunogenic fragment thereof, and a
3 polypeptide comprising at least 205 amino acids of the N-terminus of a MTB32A antigen.

1 47. The method of claim 46, further comprising a nucleic acid
2 encoding a polypeptide comprising at least 132 amino acids of the C-terminus of a
3 MTB32A antigen from a *Mycobacterium* species of the tuberculosis complex.

1 48. The method of claim 42, wherein the nucleic acid encodes a fusion
2 polypeptide comprising a MTB39 antigen or an immunogenic fragment thereof and a
3 nucleic acid encoding a MTB32A antigen or an immunogenic fragment thereof.

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1 49. The method of claim 48, wherein the nucleic acid encodes a fusion
2 polypeptide comprising a MTB39 antigen or an immunogenic fragment thereof, and a
3 polypeptide comprising at least 205 amino acids of the N-terminus of a MTB32A antigen.

1 50. The method of claim 49, wherein the fusion polypeptide further
2 comprises a polypeptide comprising at least 132 amino acids of the C-terminus of a
3 MTB32A antigen.

1 51. The method of claim 49, wherein the nucleic acid encodes a fusion
2 polypeptide having the amino acid sequence of MTB59F.

1 52. The method of claim 51, wherein the nucleic acid has the
2 nucleotide sequence of the nucleic acid encoding MTB59F.

1 53. The method of claim 50, wherein the nucleic acid encodes a fusion
2 polypeptide having the amino acid sequence of MTB72F.

1 54. The method of claim 53, wherein the nucleic acid has the
2 nucleotide sequence of the nucleic acid encoding MTB72F.

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A2

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D8

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